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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/335,618 | 06/18/1999 | JOSEPH M. BRAND | MIO-051-PA | 6676 |

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EXAMINER

CHAMBLISS, ALONZO

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 12/14/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------|-----------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/335,618 | JOSEPH M. BRAND |
| | Examiner | Art Unit |
| | Alonzo Chambliss | 2814 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 05 December 2001.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1,4-13, 23 and 32-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,4-13,23 and 32-34 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____ .

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . 6) Other: _____ .

DETAILED ACTION

1. Claims 2, 3, 14-22, and 24-31 have been canceled.

Response to Arguments

2. Applicant's arguments filed 11/14/01 have been fully considered but they are not persuasive.

Applicant alleges that neither Hegel nor Juskey disclose an encapsulant positioned to mechanically couple the semiconductor die to the first major surface of the laminate. This argument is respectfully deemed to be unpersuasive because Hegel is relied upon to teach an encapsulant positioned to mechanically couple the semiconductor die 13 to the first major surface of the laminate 10. The plastic pillars are used to form a lock between the encapsulant, the laminate (i.e. substrate), and the semiconductor device (see col. 4 lines 18-26).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4-6, 8-12, 23, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Hegel (U.S. 5,255,157).

With respect to Claims 1, 4, 8-10, 23, and 32 Hegel teaches a chip 13 and a laminate defining first and second major faces. The laminate 10 has an electrically conductive layer, an underlying substrate supporting the electrically conductive layer, and at least one void 21 in the laminate 10 so as to extend from the first major face through the electrically conductive layer. The void 21 goes through the underlying substrate and through the second major face. An encapsulant 16 is positioned to mechanically couple the semiconductor die 13 to the first major surface of the laminate 10, wherein the encapsulant is further positioned to extend through the void 21 from the first major face to the second major face and contacting the underlying substrate. The plastic encapsulant 16 locks to the substrate thereby creating an adhesive bond (see col. 2 lines 13-38 and 59-69 and col. 4 lines 18-26; Fig. 4).

With respect to Claims 5 and 11, the encapsulant 16' occupies substantially the entire void 21 (see Fig. 4).

With respect to Claims 6 and 12, the chip 13 is supported by the laminate and wherein the encapsulant 16,16' and the laminate 10 are arranged to enclose substantially the entire chip 13 (see Fig. 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hegel (U.S. 5,255,157) as applied to claim 1 above, and further in view of Juskey et al. (U.S. 5,336,931).

Hegel fails to disclose a solder mask as part of the laminate, wherein the conductive layer is between the solder mask and the substrate with a void extending through the solder mask. However, with respect to Claims 7, 33, and 34, Juskey discloses a solder mask as part of the laminate, wherein the conductive layer is between the solder mask and the substrate 160. The void 150 extends through the solder mask (see col. 4 lines 54-68 and col. 5 lines 1-4; Figs 2 and 3). Therefore, it would have been obvious to use the solder mask taught by Juskey as part of the laminate taught by Hegel to facilitate the formation of metal patterns on the laminate that are used as connection areas for bonding wires extending from the chip.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hegel (U.S. 5,255,157) as applied to claim 1 above, and further in view of Papathomas. (U.S. 5,623,006).

Hegel fails to disclose a laminate made of FR-4 epoxy glass. However, with respect to Claim 23, Papathomas discloses a laminate made of FR-4 epoxy glass (see col. 8 lines 35-45). Therefore, it would have been obvious to substitute the FR-4 epoxy glass taught by Papathomas with the laminate taught by Hegel since conventional materials such as FR-4 epoxy glass and laminates are preferred materials used for substrate or printed circuit boards because of their high temperature characteristics.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. It is cited primarily to show the product of the instant invention.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.



OLIK CHAUDHURI
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AC/December 12, 2001